UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,520	09/13/2001	Anthony John O'Dowd	GB920000078	2615

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EXAMINER
ROCHE, TRENTON J

ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/682,520	O'DOWD, ANTHONY JOHN
	Examiner	Art Unit	
	Trent J Roche	2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *8/23/04, 9/29/04 and 11/8/04*.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-15* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-15* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *29 September 2004* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☒ All   b) ☐ Some * c) ☐ None of:

   1. ☒ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____.

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1.   This office action is responsive to communications filed 23 August 2004, 29 September 2004

and 8 November 2004.

2.   Claims 1-15 have been examined.

Priority

3.   Receipt is acknowledged of papers submitted 8 November 2004 under 35 U.S.C. 119(a)-(d),

which papers have been placed of record in the file.

Drawings

4.   The drawings were received on 29 September 2004. These drawings are acceptable.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6.   Claim1, 13 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent

6,173,395 to Wisor et al, hereafter referred to as Wisor.

Regarding claim 1:

Wisor teaches:

- a method for tracing the execution path of a computer program comprising at least one module including a plurality of instructions ("to enable the user to trace the sequence of execution of instructions..." in col. 3 lines 1-2)

- at least one of said instructions being a branch instruction ("The stored data identifies whether or not certain branches in the test program were taken..." in col. 4 lines 58-59)

- identifying each branch instruction ("involves detecting the branch instructions..." in col. 6 lines 16-17)

- evaluating each branch instruction to be one of true and false, and responsive to an evaluation of true, pushing a unique identifier into a predefined area of storage, wherein said unique identifier is associated with the instructions executed as a result of said evaluation of true ("When a test program is executed, a trace record is generated and stored in the BTHB (branch trace history buffer)...the bitmap entries are generated for a series of conditional branches and contain individual bits which represent the taken or not-taken status of the branches" in col. 3 lines 11-21.)

substantially as claimed.

Regarding claim 13 and 14:

Claims 13 and 14 are directed a an apparatus and method for performing the method of claim 1, and are rejected for the reasons set forth in connection with claim 1.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,173,395 to Wisor et al, hereafter referred to as Wisor.

Regarding claim 2:

The rejection of claim 1 is incorporated, and further, Wisor discloses providing the predefined area of storage with memory (Note Figure 1, item 30). Wisor does not explicitly disclose the memory as being volatile memory. Official Notice is taken that at the time the invention was made, the use of volatile memory was well known to one of ordinary skill in the art. As such, one of ordinary skill in the art at the time the invention was made would choose to utilize volatile memory for the system disclosed by Wisor for the purposes of freeing memory space when the computer is powered down and no longer in use.

Regarding claim 3:

The rejection of claim 1 is incorporated, and further, Wisor discloses providing the predefined area of storage with memory (Note Figure 1, item 30). Wisor does not explicitly disclose the memory as being non-volatile memory. Official Notice is taken that at the time the invention was made, the use of non-volatile memory was well known to one of ordinary skill in the art. As such, one of ordinary skill in the art at the time the invention was made would choose to utilize non-volatile memory for the system disclosed by Wisor for the purposes of retaining information in memory when the computer is powered down and no longer in use.

9.   Claims 4-12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Patent 6,173,395 to Wisor et al, hereafter referred to as Wisor in view of U.S. Patent 6,353,924 to

Ayers et al, hereafter referred to as Ayers.

Regarding claim 4:

The rejection of claim 1 is incorporated, and further, Wisor discloses outputting the contents of the

storage area at a predetermined point in time ("the contents of the BTHB and the test code are

retrieved into the test station" in col. 3 lines 22-24). Wisor does not explicitly disclose outputting the

contents to a file. Ayers discloses in an analogous trace recording system outputting trace sequence

information to a file as claimed ("The sequence information can be recorded...to a disk file" in col.

3 lines 60-61). It would have been obvious to one of ordinary skill in the art at the time the

invention was made to use the file saving capabilities of Ayers with the trace recording system of

Wisor, as this would enable a user to archive tracing records in the system disclosed by Wisor.

Regarding claim 5:

The rejection of claim 4 is incorporated, and further, Wisor discloses outputting the trace

information upon exit from at least one module as claimed ("After a program is executed on the

system under test, the contents of the BTHB are retrieved into the computer system" in col. 9 lines

11-12)

Regarding claim 6:

The rejection of claim 5 is incorporated, and further, Wisor discloses outputting the contents of the storage area at the same time as the exit trace information as claimed ("After a program is executed on the system under test, the contents of the BTHB are retrieved into the computer system" in col. 9 lines 11-12)

Regarding claim 7:

The rejection of claim 4 is incorporated, and further, Wisor discloses determining whether the ● storage area is full, and responsive to a positive determination, outputting the contents as claimed ("Tracing can be set to stop…when the BTHB is full" in col. 8 lines 34-35)

Regarding claim 8:

The rejection of claim 4 is incorporated, and further, Wisor does not explicitly disclose determining whether a failure has occurred within the program, and responsive to a positive determination, outputting the contents to a file. Ayers discloses in an analogous trace recording system determining whether a failure has occurred and outputting the contents to a file as claimed ("upon some triggering event such as a system crash, the post-processor writes out the sequence record…" in col. 9 lines 65-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the failure-responsive outputting capabilities of Ayers with the trace recording system of Wisor, as this would enable a user to obtain the exact sequence of instructions that executed prior to a crash in the system disclosed by Wisor as stated in col. 2 lines 21-27 of Ayers.

Regarding claim 9:

The rejection of claim 4 is incorporated, and further, Wisor discloses determining whether the predefined area of storage is full, and overwriting the first unique identifier in the storage area as claimed ("The buffer can be set to wrap around so that the oldest entries are overwritten by the newest entries..." in col. 8 lines 35-37)

Regarding claim 10:

The rejection of claim 9 is incorporated, and further, Wisor discloses writing the position of the most recent unique identifier to be written out to the storage area to the storage area as claimed ("When a conditional branch is found, a counter is incremented..." in col. 9 lines 57-58. The counter represents the position.)

Regarding claim 11:

The rejection of claim 10 is incorporated, and further, Wisor discloses using the position to determine number of unique identifiers that have been overwritten as claimed ("the BTHB contents are checked to determine whether the number of bits...matches the corresponding number of conditional branches in the instruction sequence" in col. 9 lines 18-21)

Regarding claim 12:

The rejection of claim 11 is incorporated, and further, Wisor does not explicitly disclose increasing the size of the predefined area of storage. Ayers discloses in an analogous trace recording system increasing the size of the predefined area of storage as claimed ("The buffer size limits the amount of traceback history...Preferably this limit can be set dynamically..." in col. 6 lines 26-28). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the

size-increasing capabilities of Ayers with the trace recording system of Wisor, as this would enable a

user to obtain a larger amount of traceback history in the system disclosed by Wisor.

Regarding claim 15:

Claim 15 recites a compiler for performing the method of claim 1, and is rejected for the reasons set

forth in connection with claim 1. For the added limitation of a compiler, Wisor does not explicitly

disclose a compiler. Ayers discloses in an analogous trace recording system a compiler for

instrumenting a computer program as claimed (Note Figure 4, items 311 and 313 and the

corresponding sections of the disclosure). It would have been obvious to one of ordinary skill in the

art at the time the invention was made to use a compiler in the system of Wisor, as this would enable

source code to be executed and subsequently traced.

Response to Arguments

10.   Applicant's arguments filed 23 August 2004 have been fully considered but they are not

persuasive.

Per claims 1, 13, 14 and 15:

The applicant states that Wisor does not teach or reasonably suggest "pushing a unique identifier

into a predefined area of storage, wherein said unique identifier is associated with the instructions

executed as a result of said evaluation of true," as recited in claim 1. Similar aspects are claimed in

independent claims 13, 14 and 15. The prior office action contends that the bitmap entries recited by

Wisor, which are generated based on a trace record, stored in a trace buffer, and which represent the

taken or not-taken status of the branches, discloses the required limitations of "pushing a unique

identifier into a predefined area of storage, wherein said unique identifier is associated with the

instructions executed as a result of said evaluation of true." This rejection is upheld for the following

reasons:

The applicant states that the bitmap entries are expressly described as containing individual bits,

which represent the taken or not-taken status of the branches, and thus are not considered "unique"

sine they merely represent whether a branch is taken or not taken. In response, it is noted that the

bitmap entries entered into the branch trace history buffer contain individual bits, as well as other

related information concerning the trace data. "The bitmap entries do, however, include tag

information to identify them as bitmap entries, and they include the same miscellaneous information

as the other entries." in col. 7 lines 16-19. Consequently, according to the broadest reasonable

interpretation of the claim language, the bitmap entries are "unique" in that they contain individual

bits, as well as relevant information such as tag information and miscellaneous information to

uniquely identify the entries as bitmap entries and associate the entries with branches of a program.

Furthermore, the individual bits are themselves unique, in that their organization is uniquely

organize according to the invention of Wisor to represent branch information and save storage

space. "Conditional branch information is therefore compressed and represented as a bitmap. That

is, a series of consecutive conditional branches is represented as a seies of consecutive bits in a single

entry…the representation of these branches with a single bit per branch greatly reduces the amount

of storage space required for the trace information…" in col. 7 lines 1-9. As such, Wisor does

disclose "pushing a unique identifier into a predefined area of storage, wherein said unique identifier

is associated with the instructions executed as a result of said evaluation of true." For these reasons,

the rejections of claims 1, 13, 14 and 15 are proper and maintained.

Per claims 2-12:

The applicant states that claims 2-12 are allowable as being dependent on an allowable base claim.

As was shown above, the rejections of independent claims 1, 13, 14 and 15 are proper and

maintained, and as such, the argument that claims 2-12 are allowable as being dependent upon an

allowable base claim is considered moot. Futhermore, the applicant fails to show that the reasons to

combine and motivations concerning the rejections of claim 2-12 are improper. As such, the

rejections of claim 2-12 are proper and maintained.

Conclusion

11.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

   A shortened statutory period for reply to this final action is set to expire THREE MONTHS

from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the

mailing date of this final action and the advisory action is not mailed until after the end of the

THREE-MONTH shortened statutory period, then the shortened statutory period will expire on

the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

calculated from the mailing date of the advisory action. In no event, however, will the statutory

period for reply expire later than SIX MONTHS from the mailing date of this final action.

12.   Any inquiry concerning this communication or earlier communications from the examiner

should be directed to Trent J Roche whose telephone number is (571)272-3733. The examiner can

normally be reached on Monday - Friday, 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor,

Kakali Chaki can be reached on (571)272-3719. The fax phone number for the organization where

this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

, may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system,

see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system,

contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Trent J Roche
Examiner
Art Unit 2124

TJR

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